MILES BERRY PRINCIPAL LECTURER

TEACHERS' KNOWLEDGE

Teaching as an engineering discipline

We talk of the 'art of teaching': that teaching is akin to performance, an inherently creative process, and that engagement is key to its success. We talk also of the 'science of teaching': that our approach should be informed by research, that results should be measurable and that data is central to the process. Teaching is both an art and a science, but for the pragmatic educator, perhaps it's helpful to think of teaching as closer to an engineering discipline.

Teaching as engineering would acknowledge that what we do as educators is creative, in the literal sense of making things: the learning environment, resources for our learners (always one of my favourite parts of the job), and learning experiences (whether recorded in lesson plans or not). More importantly, as educators we make connections inside our learners' heads: connecting neurons which weren't connected before, or strengthening the connections that are already there. Unless our learners' brains have changed, can we really say we've taught anything?

Making progress

Teaching as engineering also acknowledges the fundamental moral purpose to what we do: were it merely an art, it would be sufficient to engage and entertain; were it just science, it would be enough to understand how our students learn and how we might most effectively teach; as an engineering discipline, our focus has to be on ensuring our students make progress, that they can do more, know more and understand more than they would otherwise. We share with engineers the core engineering mind of 'making things that work and making things work better', even if the 'things' here are less tangible than a bridge, a circuit board or a software system.

Just as engineering is the systematic application of science, so education is, or should be, the systematic application of what we know about how learning happens to the acquisition of new skills, knowledge and understanding by our students. This is why it matters that educators understand enough of how the brain works, and how a group of learners engage and interact, to be able to apply this knowledge to creating the resources, experiences and environment through which learning will happen.

Problem finding

Jon Chippindall's discussion of 'engineering habits of mind' (page 22) is as relevant to education as it is to other engineering disciplines: when we teach new content, or work with new classes, we're problem finding; the best educators adapt and apply the resources and plans of others; systematic, holistic thinking is essential for the educator; educators should be relentlessly seeking to improve their practice and their students' outcomes; visualisation gives us, and our students, a way to think about complex ideas and systems; and the job of a teacher involves creative problem solving on a lesson-by-lesson, day-by-day and year-by-year basis.

Engineering wouldn't be possible without engineering education: few of us in schools have a background in engineering, but if we think of teaching itself as a sort of engineering then all of us can perhaps help cultivate this way of looking at the world in the young people with whom we work. (HW)

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